



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/741,300	12/17/2003	Trung Tri Doan	MI22-2471	4374
21567	7590	07/14/2004	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			ANYA, IGWE U	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/741,300

Applicant(s)

DOAN ET AL.

Examiner

Igwe U. Anya

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/17/03, 5/12/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3 – 16, and 18 – 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al. (USPAB 2003/0153177) in view of Campbell et al. (US Patent 6461436).

4. Tepman et al. teach an atomic layer deposition method, comprising, positioning a semiconductor substrate (108) within an atomic layer deposition chamber (100), feeding a first deposition precursor (paragraphs 24 - 25) to the chamber under first varied vacuum pressure conditions effective to form a first monolayer on the substrate, the first vacuum conditions being maintained at least in part by closing restrictor (154) and use

of a first non-roughing pump (inherent from pressure of 10 – 300 Torr) connected to the chamber and through which at least some of the first deposition precursor flows; after forming the first monolayer, feeding a purge gas to the chamber under second vacuum conditions maintained at least in part by opening restrictor (154) and use of a second non-roughing vacuum pump (200) to facilitate evacuation connected to the chamber and through which at least some of the purge gas flows (paragraphs 27 – 28); after feeding the purge gas, feeding a second deposition precursor different from the first deposition precursor to the chamber effective to form a second monolayer on the first monolayer (paragraph 28 – 29); and further comprising, after feeding the purge gas, feeding a second deposition precursor to the chamber different from the first deposition precursor under third vacuum conditions effective to form a second monolayer on the first monolayer and using the restrictor (154) in fluid communication with the chamber during the second deposition precursor feeding (paragraph 29).

5. Tepman et al. lack the use of multiple non-roughing vacuum pumps isolated from each other, comprising a different non-roughing vacuum pump for each cycle.

6. However, Campbell et al. teach the use of multiple non-roughing vacuum pumps (20, 30) isolated from one another to prevent the reactants from reacting and forming deposits in the vacuum pumps (col. 3 line 64 – col. 4 line 15).

7. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Campbell et al. in the Tepman et al. reference and use a different non-roughing vacuum pump for each cycle to avoid a build up in pumps.

8. Regarding the chamber pressure on each cycle, where the general conditions of a claim are disclosed in prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

9. Claims 2, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al. (USPAB 2003/0153177) in view of Campbell et al. (US Patent 6461436), and further in view of Atwell (US Patent 6206970).

10. The Tepman/Campbell reference teaches the features previously outlined, but lacks using a roughing vacuum pump to lower chamber pressure prior to the first deposition precursor feeding.

11. However, Atwell teaches using a roughing vacuum pump to lower chamber pressure prior to the first deposition precursor feeding.

12. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Atwell into the Tepman/Campbell et al. reference, and use a roughing vacuum pump to lower chamber pressure prior to the first deposition precursor feeding to avoid saturation of the non-roughing pumps.

13. Regarding claim 17 to be entitled to weight in method claims, the recited structural limitations must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. Ex Parte Pfeiffer, 1962 C.D. 408 (1961).

14. Prior art considered, but not used in the rejection include Chiang et al. (US patent 6630201), Sandhu (US Patent 6730367), and Kim et al. (US Patent 6391803).

Art Unit: 2825

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Igwe U. Anya whose telephone number is (571) 272-1887. The examiner can normally be reached on M - F 8:30am - 5:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Igwe U. Anya
Examiner
Art Unit 2825

IA

June 30, 2004.


MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800